

## CLAIMS:

1. A system for multiplexed transmission of normal and robust digital video data, comprising:
  - 5 a multiplexer switching between normal and robust data inputs;
  - one or more units randomizing, formatting, interleaving and encoding data from the multiplexer into encoded data packets; and
  - a processing unit deinterleaving encoded data packets produced by the one or more units, removing a trailing portion from each encoded data packet, and
  - 10 derandomizing a remaining portion of each encoded data packet.
2. The system according to claim 1, wherein the multiplexer, the one or more units, and the processing unit form a portion of an enhanced vestigial sideband (VSB) encoder, the one or more units further comprising a data randomizer, a Reed Solomon
- 15 encoder, an interleaver and packet formatter, a main interleaver and a trellis encoder each operating in sequence on data from the multiplexer to generate the encoded data packets.
3. The system according to claim 2, further comprising:
  - a parity byte generator operating in conjunction with the trellis encoder to
  - 20 generate parity bytes for normal data switched by the multiplexer.
4. The system according to claim 1, wherein the processing unit removes the trailing portion equal to a number of bytes required to form Motion Picture Expert Group (MPEG) compliant packets.
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5. The system according to claim 4, wherein the removed trailing portion comprises parity bytes for data packets containing normal data and encoded data for data packets containing robust data.
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6. The system according to claim 1, wherein the processing unit further comprises:
  - a bit-to-byte converter and trellis deinterleaver and a main deinterleaver operating sequentially on data packets received from the one or more units; and

a derandomizer operating on data packets after removal of the trailing portion.

7. The system according to claim 2, wherein the processing unit forwards packets generated by the enhanced vestigial sideband encoder to a standard vestigial sideband modulator.

8. The system according to claim 7, wherein the standard vestigial sideband modulator further comprises:

a data randomizer, a Reed Solomon encoder, an interleaver and a trellis encoder operating sequentially on data packets received from the enhanced vestigial sideband encoder;

a multiplexer switching data packets generated by the standard vestigial sideband modulator with synchronization signals; and

an antenna transmitting signals corresponding to the switched data packets and synchronization signals.

9. A wireless transmission system including the system according to claim 8, the wireless transmitter further comprising:

a data link coupling the enhanced vestigial sideband encoder and the standard vestigial sideband modulator,

wherein the antenna transmits the signals over a wireless communications channel to a receiver.

10. The wireless transmission system according to claim 9, wherein the enhanced vestigial sideband encoder is implemented within a studio and the standard vestigial sideband modulator is implemented with a transmitter.

11. A method of multiplexed transmission of normal and robust digital video data, comprising:

switching between normal and robust data inputs;

randomizing, formatting, interleaving and encoding data from the normal and robust data inputs into encoded data packets; and

processing the encoded data packets by deinterleaving the encoded data packets, removing a trailing portion from each encoded data packet, and derandomizing a remaining portion of each encoded data packet.

- 5           12.    The method according to claim 11, wherein the switching, randomizing and processing are performed within a portion of an enhanced vestigial sideband (VSB) encoder including a data randomizer, a Reed Solomon encoder, an interleaver and packet formatter, a main interleaver and a trellis encoder each operating in sequence on data from the normal and robust data inputs to generate the encoded data packets.
- 10           13.    The method according to claim 12, further comprising:  
generating parity bytes for normal data switched from the normal data inputs.
- 15           14.    The method according to claim 11, further comprising:  
removing the trailing portion equal to a number of bytes required to form Motion Picture Expert Group (MPEG) compliant packets.
- 20           15.    The method according to claim 14, wherein the removed trailing portion comprises parity bytes for data packets containing normal data and encoded data for data packets containing robust data.
- 25           16.    The method according to claim 11, further comprising:  
bit-to-byte converting and deinterleaving data packets received from the one or more units; and  
derandomizing data packets after removal of the trailing portion.
17.    The method according to claim 12, further comprising:  
forwarding packets generated by the enhanced vestigial sideband encoder to a standard vestigial sideband modulator.

18. The method according to claim 17, further comprising:

randomizing, Reed Solomon encoding, interleaving and trellis encoding data packets received at the standard vestigial sideband modulator from the enhanced vestigial sideband encoder;

switching data packets generated by the standard vestigial sideband modulator with synchronization signals; and

transmitting signals corresponding to the switched data packets and synchronization signals.

19. A system for multiplexed transmission of normal and robust digital video data, comprising:

an enhanced vestigial sideband (VSB) encoder having normal and robust data inputs and including:

a multiplexer switching between the normal and robust data inputs;

a data randomizer, a Reed Solomon encoder, an interleaver and packet formatter, a main interleaver and a trellis encoder each operating in sequence on data from the multiplexer to randomize, format, interleave and encode data from the multiplexer and generate the encoded data packets; and

a processing unit deinterleaving encoded data packets produced by the data randomizer, Reed Solomon encoder, interleaver and packet formatter, main interleaver and trellis encoder, removing a trailing portion from each encoded data packet, and derandomizing a remaining portion of each encoded data packet; and

a standard vestigial sideband modulator receiving data packets from the enhanced vestigial sideband encoder and including:

a data randomizer, a Reed Solomon encoder, an interleaver and a trellis encoder operating sequentially on data packets received from the enhanced vestigial sideband encoder;

a multiplexer switching data packets generated by the data randomizer, Reed Solomon encoder, interleaver and trellis encoder with synchronization signals; and

an antenna transmitting signals corresponding to the switched data packets

and synchronization signals.

20. The system according to claim 19, wherein the enhanced vestigial  
sideband encoder is implemented within a studio and the standard vestigial sideband  
5 modulator is implemented with a transmitter.